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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/757,944	01/15/2004	Robert E. Bernert	R B - 3	5074

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EXAMINER

LEUNG, RICHARD L

ART UNIT	PAPER NUMBER
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3744

DATE MAILED: 08/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/757,944	Applicant(s) BERNERT, ROBERT E.	
	Examiner Richard L. Leung	Art Unit 3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(1) because the reference characters are enclosed within outlines (i.e. encircled).
2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters 1-8 have been used to designate different elements among the different drawings, for example, reference character 1 is used to indicate a pressure reducing regulator in "Drwg. Sheet 1," a liquid head pressure in "Drwg. Sheet 2," and a tank in "Drwg. Sheet 3."
3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference character(s) mentioned in the description: 10, 12, 14, 16, 18, 20, 22, 24, 28, 32, 34, 36, and 38. See pages 9-11 of the specification.
4. The drawings are objected to as failing to comply with 37 CFR 1.84(u)(1) because the different views must be numbered in consecutive Arabic numerals, starting with 1, and the view numbers must be preceded by the abbreviation "FIG."
5. New corrected drawings are required in this application because the drawings, as indicated above, fail to comply with 37 CFR 1.84 which sets the standards for drawings. Other informalities not stated may also exist. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any

amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

6. The disclosure is objected to because of the following informalities: the brief description of the several views of the drawings and the detailed description are combined in the specification. It is suggested that these two sections be treated separately and distinctly to overcome this objection. See 37 CFR 1.77 for an acceptable arrangement of application elements. Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. Claim 6 recites the limitation "backpressure control valve" in the second line of the claim. There is insufficient antecedent basis for this limitation in the claim.

"Backpressure control valve" will be understood as --backpressure control regulator-- as recited in claim 5 from which claim 6 depends.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Kohno (US-4321796). Kohno discloses a method of vaporizing a compressed liquefied gas in a tank 1 at ordinary temperature with an ordinary temperature vaporizer 3 through which said liquefied gas passes for vaporization thereof, comprising the step of passing said liquefied gas through a pressure reduction valve 13 so as to reduce its pressure (and inherently its boiling point as well) prior to passing said gas through said vaporizer 3, as required by claim 1. By "ordinary," it is understood that Kohno is referring to the atmosphere or like conditions (see column 1, lines 51-52). Kohno also discloses that said use of a pressure reducing valve is known in the art and is inevitable when a heat source providing nearly natural heat is utilized to evaporate the liquefied gas (column 4, lines 48-54). Claim 2 requires that the pressure reduction valve increases the difference between the vaporizing temperature of the liquefied gas and the temperature of the ambient air to supply heat to vaporize said liquefied gas. This would inherently occur when said pressure reduction valve 13 reduces the pressure and the boiling point of the liquefied gas, which is understood as being equivalent to the vaporizing

Art Unit: 3744

temperature. In other words, by lowering the boiling point (vaporizing temperature) of the liquefied gas, the difference between the boiling point (vaporizing temperature) and the temperature of the ambient air would necessarily increase.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kohno (US-4321796) in view of Martin (US-5069039). Kohno discloses a method for vaporizing a compressed liquefied gas stored in a tank 1 at ordinary (atmospheric) temperature, said tank 1 containing fluid in both liquid and vapor phases. It is disclosed that vaporized gas from tank 1 may be withdrawn via a supply line 7 having a pressure control regulator 14, which would inherently decrease the pressure and temperature in said tank 1, and inherently cause heat to flow from the ambient air surrounding said tank 1 into said tank 1, subsequently raising the temperature of the gas stored there, if a temperature gradient is created. Kohno fails to disclose a secondary external vaporizer separate from said supply line 7 so as to increase the rate of heat transfer from the ambient air to said gas stored in said tank 1, as required by the claim. Martin teaches a system 211 comprising a carbon dioxide storage vessel containing both vapor and liquid. Said system 211 also comprises a conventional pressure building circuit using an external vaporizer that permits an amount of liquid from said storage vessel to

vaporize into gas, said gas being returned to said storage vessel to maintain a constant pressure in said storage vessel. See column 5, lines 6-16. It would have been obvious to one of ordinary skill in the art to have added to the tank 1 disclosed by Kohno, the external vaporizer taught by Martin in order to increase the rate of heat transfer from the ambient air to the gas in said tank because Martin teaches that said external vaporizer would maintain the supply pressure in said tank (column 5, lines 6-16).

14. Claim 4, 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kohno (US-4321796) in view of Hoy et al. (US-5214925). Kohno discloses a method of vaporizing a compressed liquefied gas, which may be carbon dioxide (column 1, line 14), stored under pressure in a tank 1 wherein said liquefied gas is passed through a vaporizer 3 and thence withdrawn in a gaseous state via an exit line 12. Kohno also discloses the step of passing said liquefied gas through a pressure reduction valve 13 so as to reduce its pressure (and inherently its boiling point as well) prior to passing said gas through said vaporizer 3. Kohno fails to disclose that the pressure within said vaporizer 3 is simultaneously controlled to be above the triple point of carbon dioxide as required by claim 4, said controlling means being a back pressure control regulator as required by claim 5. Hoy et al. teach a refrigeration system using carbon dioxide comprising the use of a back pressure regulator 120 to maintain and control the pressure of said system above the triple point pressure of carbon dioxide, above about 60 psig (or about 75 psia). See column 17, lines 21-26. It would have been obvious to one of ordinary skill in the art to add to the exit line in the system disclosed by Kohno the back pressure regulator taught by Hoy et al. because Hoy et al. teach that such a

back pressure regulator, when set to a pressure above the triple point of carbon dioxide, would prevent the formation of solid carbon dioxide (column 17, line 21-26) that could readily clog the vaporizer and exit line. Claim 7 requires that the pressure in the vaporizer be maintained above 75.10 psia corresponding to a boiling temperature of – 69.9 degrees F. It is apparent that this pressure and temperature merely corresponds to the triple point of carbon dioxide and it can be understood that the combination of Kohno and Hoy et al. meets this further limitation.

15. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kohno (US-4321796) in view of Hoy et al. (US-5214925) as applied to claim 5 above, and further in view of Martin (US-5069039). The combination of Kohno and Hoy et al., as already discussed above, demonstrates a method of vaporizing a compressed liquefied gas, such as carbon dioxide, comprising the steps of first passing said liquefied gas through a pressure reducing valve subsequently followed by vaporizing of said liquefied gas in a vaporizer, the pressure of which is maintained above the triple point of carbon dioxide using a back pressure regulator. The combination of Kohno and Hoy et al. fail to demonstrate a pressure relief valve positioned between the vaporizer and the back pressure regulator, as understood from claim 6. Martin teaches the use of a pressure relief valve 220 following a heat exchanger 215 in which carbon dioxide is heated. Martin teaches that said pressure relief valve 220 controls the maximum pressure of the warmed carbon dioxide (column 4, lines 43-45). It would have been obvious to one of ordinary skill in the art to include in the combination of Kohno and Hoy et al. the pressure relief valve taught by Martin immediately after the vaporizer in order to control

the maximum pressure of the vaporized liquefied gas, for example, as a way to prevent the pressure in the system from reaching unsafe levels.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US-2359219 Jones 09-26-1944: discloses a means for dispensing vaporized liquefied gas comprising the steps of passing a liquefied gas through an expansion (pressure-reducing) valve prior to passing the gas through a vaporizer.

US-2497754 Baker et al. 02-14-1950: discloses an apparatus and process of discharging vaporizable liquid comprising the steps of passing a liquefied gas under reduced pressure through a vaporizer.

US-2548335 Balogh 04-10-1951: discloses a system wherein liquid flows through an expansion valve (pressure-reducing means) prior to being vaporized in an evaporator.

US-2747374 Thompson 05-29-1956: discloses a liquefied gas system and indicates that it is conventional in the art to pass liquid through a pressure-reducing valve prior to vaporization.

US-3216209 Krigsmann 11-09-1965: discloses a storage system for liquefied gases comprising a pressure-reducing valve in series with a vaporizer, an external heat exchanger, and a pressure relief valve. Heat is added to the system via the external heat exchanger or from heat leak through the walls of the system from the ambient atmosphere.

US-5228295 Gustafson 07-20-1993: discloses a storage tank containing a liquefied gas and a vapor head, connected to which is an external vaporizer for increasing the rate of heat transfer to the gas stored within the storage tank in order to maintain a suitable pressure.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard L. Leung whose telephone number is 703-306-4154. The examiner can normally be reached on Mon-Fri.

Application/Control Number: 10/757,944
Art Unit: 3744


Page 9

18. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Denise L. Esquivel can be reached on 703-308-2597. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

19. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Richard L. Leung
Examiner
Art Unit 3744

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